

IN THE DRAWINGS

The attached sheet of drawings includes changes to Figs. 3, 6, 12, 13, 15, 16, 18, and 19. These sheets, which include Figs. 3, 6, 12, 13, 15, 16, 18, and 19, replace the original sheets including Figs. 3, 6, 12, 13, 15, 16, 18, and 19.

Attachment: Replacement Sheets (8)

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion is respectfully requested. Claims 1-6, 9, 15-18, 21-25, 31, 36 and 37 are currently pending in the application; Claims 1, 6, 25, and 36 are amended only to clarify the claimed subject matter; and Claims 7, 8, 10-14, 19, 20, 26-30, and 32-35 were previously cancelled without prejudice or disclaimer.

In the outstanding Office Action, Figures 3, 6, 12, 13, 15, 16, 18, and 19 are objected to for minor informalities; the specification is objected to for including an informality; Claims 1, 5, 6, 9, 21, 22, 24, 25 and 37 are rejected under 35 U.S.C. § 102(e) as being anticipated by Bejjani et al. (U.S. Patent No. 6,430,166, hereinafter “Bejjani”); Claims 2-4 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bejjani as applied to Claim 1, and further in view of Sutton et al. (U.S. Patent No. 6,721,299, hereinafter “Sutton”); Claims 15-18 and 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bejjani in view of Papasakellariou (U.S. Patent No. 6,700,919); Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Papasakellariou (U.S. Patent No. 6,700,919) in view of Sutton; and Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bejjani in view of Papasakellariou and Sutton.

With respect to the objection of Figures 3, 6, 12, 13, 15, 16, 18, and 19, the Figures have been amended as suggested. Accordingly, the drawings are now believed to be compliant and no further objection on this basis is anticipated.

With respect to the objection of the specification, the specification has been amended as suggested. Accordingly, the grounds for the objection are believed to have been overcome. Therefore, it is respectfully requested that the objection to the specification be withdrawn.

With respect to the rejection of Claim 1, Applicants respectfully traverse this rejection. Claim 1 allows for improved reception of a multipath signal against interference, thermal noise¹, and fading over the background art², Claim 1 states:

A path search method for detecting timings of path components included in a signal received via a multipath propagation path, said method comprising:

a first path search step detecting the timings of the path components using pilot symbols of a known phase included in said signal received via the multipath propagation path; and

a second path search step detecting the timings of the path components using information symbols that are derived from a signal demodulated according to said timings detected in the first path search step and said pilot symbols of the known phase.

The claimed subject matter is an advancement over the background art because it enables packet switched multipath systems to have an improvement in reception quality whereas the background art focused mainly on reception quality for circuit switched systems amongst other problems.³

Bejjani is directed toward an enhanced path searcher which is accomplished by reducing computational complexity and obtaining better performance by the second path searcher by performing two path search operations in a joint manner.⁴ Bejjani uses two path search operations on two different channels. Bejjani carries out a first path search on the common channels (CCPCH, PCCPCH, SCH) and a second path search on a dedicated channel (DPCH).⁵ Bejjani is based upon the observation “that power delay spread experienced by the dedicated channels is a subset of the one experienced by the common channels” therefore requiring two different channels or signals be used.

Claim 1 does not require two different channels or signals be used in order to improve reception quality. Rather Claim 1 is directed toward using a first path search step to detect the

¹ Specification at page 1, line 22 to page 2, line 30.

² Specification at page 4, line 26 to page 7, line 16.

³ *Id.*

⁴ Bejjani, col. 2, lines 26-45.

⁵ Bejjani, Figure 3 inputs to 3a and 3b, col. 3, lines 39-44.

timings of the path components using pilot symbols of a known phase included in the signal received via the multipath propagation path, and a second path search step detects the timings of the path components using information symbols that are derived from a signal demodulated according to the timings detected in the first path search step and the pilot symbols of the known phase. The path search by the first path search step or part and the path search by the second path search step or part are carried out with respect to the signal received via the multipath propagation path, that is, with respect to the same channel or signal.

Moreover, Claim 1 describes a second path search step detecting the timings of path components using information symbols **that are derived from a signal demodulated according to said timings detected in the first path search step**. Bejjani's second path search step is **not** derived from a signal **demodulated** according to said timings detected in the first path search step.⁶ Rather than using the same signal information its second path searcher Bejjani uses a "second input from the dedicated control channel DPCH."⁷

Therefore, Bejjani fails to disclose every feature of Claim 1. Specifically, Bejjani fails to disclose, among other things, a first path search step that detects the timings of the path components using pilot symbols of a known phase included in the signal received via the multipath propagation path, and a second path search step that detects the timings of the path components using information symbols **that are derived from a signal demodulated according to the timings detected in the first path search step** and the pilot symbols of the known phase. Accordingly, Applicants respectfully request the rejection of Claim 1 under 35 U.S.C. § 102(e) be withdrawn and the same rejection of Claims 5, 6, 9, 21, 22, 24, 25 and 37 also be withdrawn as Claims 6, and 25 recite similar feature in alternate statutory form and Claims 5, 9, 21, 22, and 37 are dependent upon base Claims 1, 6, and 25.

⁶ Bejjani, Figure 3 inputs to 3a and 3b, col. 3, lines 39-44.

⁷ Bejjani, col. 4, lines 9-11.

In response to the rejection of Claims 2-4 under 35 U.S.C. 103(a) as being unpatentable over Bejjani in view of Sutton, this rejection is respectfully traversed. Claims 2-4 are dependent on Claim 1. As discussed above, Claim 1 is believed to be allowable. Further it is respectfully submitted that the Office Action does not rely upon Sutton for the features identified as deficient in Bejjani.

It is therefore respectfully requested that the rejection of Claims 2-4 under 35 U.S.C. § 103(a) be withdrawn.

In response to the rejection of Claims 15-18 and 23 under 35 U.S.C. 103(a) as being unpatentable over Bejjani in view of Papasakellariou, this rejection is respectfully traversed. Claims 15-18 and 23 are dependent on Claim 6 and Claim 25. As discussed above, Claim 6 and Claim 25 are believed to be allowable. Further it is respectfully submitted that the examiner does not rely upon Papasakellariou for the features identified as deficient in Bejjani.

It is therefore respectfully requested that the rejection of Claims 15-18 and 23 under 35 U.S.C. § 103(a) be withdrawn.

In response to the rejection of Claim 36 under 35 U.S.C. 103(a) as being unpatentable over Papasakellariou in view of Sutton, Applicants respectfully traverse that rejection.

Claim 36 recites, *inter alia*:

a path search and channel estimation part configured to carry out at least one of a path search and a channel estimation using pilot symbols of a known phase included in a signal received via a multipath propagation path and information symbols; and

a feedback part configured to feed back said information symbols, wherein said path search and channel estimation part recursively implements the path search and the channel estimation by repeating processes of implementing a path search using information symbols that are decoded after a channel estimation and the pilot symbols and implementing a channel estimation using the information symbols that are fed back via said feedback part in accordance with a timing detected in said path search and the pilot symbols.

The Office Action acknowledges that Papasakellariou fails to teach the path search feature of the present invention and attempts to remedy this by relying on Sutton. Sutton, however, describes a path search feature which “uses an alternate set of parameters for the next sweep or search.”⁸ Claim 36 uses a path search, wherein said path search and channel estimation part recursively implements **the path search** and not an alternate set of parameters. Rather the path search and channel estimation part recursively implements **the path search** and the channel estimation by repeating processes of (i) implementing a path search using information symbols that are decoded after a channel estimation and the pilot symbols and (ii) implementing a channel estimation using the information symbols that are fed back via the feedback part in accordance with a timing detected in the path search and the pilot symbols.⁹ “To establish a *prima facie* case of obviousness, ... all the claim limitations [must be taught or suggested]”¹⁰ by the combination of Papasakellariou and Sutton. In the present case, neither Papasakellariou nor Sutton teaches or suggests this path search feature which is present in independent Claims 36.

Accordingly, it is believed that Claim 36 is allowable over Papasakellariou and Sutton. It is therefore respectfully requested that the rejection of Claim 36 under 35 U.S.C. § 103(a) be withdrawn.

In response to the rejection of Claim 31 under 35 U.S.C. 103(a) as being unpatentable over Bejjani in view of Papasakellariou and Sutton, Applicants respectfully traverse this rejection. Claim 31 is dependent on Claim 25. As discussed above Claim 25 is believed to be allowable. Further it is respectfully submitted that the Office Action does not rely upon Papasakellariou nor Sutton for the features identified as deficient in Bejjani.

⁸ Sutton, col. 2, lines 26-27 and Figure 3, element 41.

⁹ Specification, page, 26, line 20 to page 27, line 19.

¹⁰ See, MPEP § 706.02(j).

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It is therefore respectfully requested that the rejection of Claim 31 under 35 U.S.C. § 103(a) be withdrawn.

Consequently, in view of the present amendment and in light of the above discussion, Claims 1-6, 9, 15-18, 21-25, 31, 36 and 37 are believed to be in condition for allowance. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

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